CLAIMS

1. A method of acquiring pulse oximetry and electrocardiogram signals from a patient, the method comprising:

attaching a single transducer to a patient;

acquiring a pulse oximetry signal with the single transducer; and

acquiring an electrocardiogram signal with the single transducer.

2. The method of claim 1 and further comprising generating a blood oxygen saturation output signal based on the pulse oximetry signal.

3. The method of claim 1 and further comprising acquiring a reference electrocardiogram signal with the single transducer.

4. The method of claim 3 and further comprising attaching at least one additional electrode to the patient, and acquiring at least one non-reference electrocardiogram signal from the patient.

5. The method of claim 4 and further comprising generating at least one electrocardiogram output signal based on the reference electrocardiogram signal and the at least one non-reference electrocardiogram signal.

6. The method of claim 5 and further comprising acquiring an impedance respiration signal from the patient.

7. The method of claim 6 and further comprising generating a cardio-respirogram output signal based on the pulse oximetry signal, the reference electrocardiogram signal, the at least one non-reference electrocardiogram signal, and the impedance respiration signal.

8. The method of claim 4 and further comprising generating at least one channel of electrocardiogram output data based on the reference electrocardiogram signal and the at least one non-reference electrocardiogram signal.

9. The method of claim 1 and further comprising attaching the single transducer and at least two additional electrodes to the patient, and acquiring signals to generate a cardio-respirogram output signal.

10. The method of claim 1 and further comprising attaching a neural-muscular transmission device to the patient and acquiring a neural-muscular transmission signal.

11. The method of claim 10 and further comprising filtering at least one of the pulse oximetry signal and the electrocardiogram signal acquired when the neural-muscular transmission signal was being acquired.

12. The method of claim 10 and further comprising ignoring at least one of the pulse oximetry signal and the electrocardiogram signal acquired when the neural-muscular transmission signal was being acquired.

13. The method of claim 10 and further comprising using the neural-muscular transmission signal to monitor anesthesia.

14. The method of claim 1 and further comprising attaching a single transducer to the patient, the single transducer including an oximeter having at least two light-emitting diodes.

15. The method of claim 1 and further comprising attaching a single transducer to the patient, the single transducer including a photo plethysmograph sensor having at least one light-emitting diode.

16. A device for acquiring pulse oximetry and electrocardiogram signals from an appendage of a patient, the device comprising:

a substrate that can be attached to the appendage of the patient;

at least one emitter coupled to the substrate, the at least one emitter positioned to emit radiation through the appendage;

at least one detector coupled to the substrate, the at least one detector positioned to receive the radiation emitted through the appendage, the at least one detector generating a pulse oximetry signal based on the received radiation; and

an electrode coupled to the substrate, the electrode generating an electrocardiogram signal.

17. The device of claim 16 wherein the at least one emitter includes a first red light-emitting diode and a second infra-red light-emitting diode.

18. The device of claim 17 wherein the at least one detector includes a single detector to receive radiation emitted by the first red light-emitting diode and the second infra-red light-emitting diode.

19. The device of claim 16 and further comprising a common reference wire coupled to the electrode and the at least one detector.

20. The device of claim 16 and further comprising an electrocardiogram reference wire coupled to the electrode and an oximetry reference wire coupled to the at least one detector in order to isolate the electrode from the at least one detector.

21. The device of claim 16 and further comprising a multi-wire connector coupled to the at least one emitter, the at least one detector, and the electrode.

22. The device of claim 16 wherein the substrate is sized for attachment to an appendage of at least one of an infant and a neonate.

23. The device of claim 16 wherein the substrate includes an elongated portion adapted to be folded in half over the appendage in order to position the at least one emitter to emit radiation through a first side of the appendage and the at least one detector to receive the emitted radiation through a second side of the appendage.

24. The device of claim 16 and further comprising a neural-muscular transmission device coupled to the substrate, the neural-muscular transmission device generating a neural-muscular signal.

25. The device of claim 24 and further comprising a processor that filters at least one of the pulse oximetry signal and the electrocardiogram signal acquired when the neural-muscular transmission signal was being acquired.

26. The device of claim 24 and further comprising a processor that ignores at least one of the pulse oximetry signal and the electrocardiogram signal acquired when the neural-muscular transmission signal was being acquired.

27. The device of claim 16 wherein the electrode generates a reference electrocardiogram signal.

28. A system for monitoring pulse oximetry and electrocardiogram signals acquired from a patient, the system comprising:

a transducer including

a substrate that can be attached to an appendage of the patient,

at least one emitter coupled to the substrate, the at least one emitter positioned to emit radiation through the appendage,

at least one detector coupled to the substrate, the at least one detector positioned to receive the radiation emitted through the appendage, the at least one detector generating a pulse oximetry signal, and

a first electrode coupled to the substrate, the first electrode generating a reference electrocardiogram signal;

at least one second electrode attached to the patient, the at least one second electrode generating a non-reference electrocardiogram signal; and

a monitoring instrument that receives the pulse oximetry signal, the reference electrocardiogram signal, and the non-reference electrocardiogram signal, the monitoring instrument generating a blood oxygen saturation output signal and at least one electrocardiogram output signal.

29. The system of claim 28 wherein the monitoring instrument generates an impedance respiration signal from at least one of the first electrode and the at least one second electrode.

30. The system of claim 29 wherein the monitoring instrument generates a cardio-respirogram output signal based on the pulse oximetry signal, the reference electrocardiogram signal, the at least one non-reference electrocardiogram signal, and the impedance respiration signal.

31. The system of claim 28 wherein the monitoring instrument generates at least one channel of electrocardiogram output data based on the reference electrocardiogram signal and the at least one non-reference electrocardiogram signal.

32. The system of claim 28 wherein the at least one emitter includes a first red light-emitting diode and a second infra-red light-emitting diode.

33. The system of claim 32 wherein the at least one detector includes a single detector to receive radiation emitted by the first red light-emitting diode and the second infra-red light-emitting diode.

34. The system of claim 28 wherein the transducer includes a common reference wire coupled to the first electrode and the at least one detector.

35. The system of claim 28 wherein the transducer includes an electrocardiogram reference wire coupled to the first electrode and an oximetry reference wire coupled to the at least one detector in order to isolate the first electrode from the at least one detector.

36. The system of claim 35 wherein the transducer includes a multi-wire connector coupled to the at least one emitter, the at least one detector, and the first electrode.

37. The system of claim 28 wherein the substrate is sized for attachment to an appendage of at least one of an infant and a neonate.

38. The system of claim 28 wherein the substrate includes an elongated portion adapted to be folded in half over the appendage in order to position the at least one emitter to emit radiation through a first side of the appendage and the at least one detector to receive the emitted radiation through a second side of the appendage.

39. The system of claim 28 and further comprising a neural-muscular transmission device coupled to the substrate, the neural-muscular transmission device generating a neural-muscular transmission signal, the monitoring instrument generating a neural-muscular transmission output signal for monitoring anesthesia.

40. The device of claim 39 wherein the monitoring instrument filters at least one of the pulse oximetry signal and the electrocardiogram signal acquired when the neural-muscular transmission signal was being acquired.

41. The device of claim 39 wherein the monitoring instrument ignores at least one of the pulse oximetry signal and the electrocardiogram signal acquired when the neural-muscular transmission signal was being acquired.

42. A method of acquiring pulse oximetry and electrocardiogram signals from a patient, the method comprising:

attaching a transducer to an appendage of the patient, the transducer including at least one emitter, at least one detector, and a first electrode;

attaching at least one second electrode to the patient;

acquiring a pulse oximetry signal from the at least one detector;

acquiring a reference electrocardiogram signal from the first electrode;

acquiring at least one non-reference electrocardiogram signal from the at least one second electrode;

generating a blood oxygen saturation output signal based on the pulse oximetry signal; and

generating at least one electrocardiogram output signal based on the reference electrocardiogram signal and the at least one non-reference electrocardiogram signal.

43. The method of claim 42 and further comprising generating an impedance respiration signal based on the first electrode and the at least one second electrode.

44. The method of claim 43 and further comprising generating a cardio-respirogram output signal based on the pulse oximetry signal, the reference electrocardiogram signal, the at least one non-reference electrocardiogram signal, and the impedance respiration signal.

45. The method of claim 42 and further comprising generating at least one channel of electrocardiogram output data based on the reference electrocardiogram signal and the at least one non-reference electrocardiogram signal.

46. A method of acquiring pulse oximetry and electrocardiogram signals from an infant, the method comprising:

attaching a transducer to the infant, the transducer including at least one emitter, at least one detector, and a first electrode;

attaching at least two additional electrodes to the infant;

acquiring a pulse oximetry signal from the detector, a reference electrocardiogram signal from the first electrode, and at least two non-reference electrocardiogram signals from the at least two additional electrodes; and

generating a blood oxygen saturation output signal based on the pulse oximetry signal and generating at least one electrocardiogram signal based on the reference electrocardiogram signal and the at least two non-reference electrocardiogram signals.